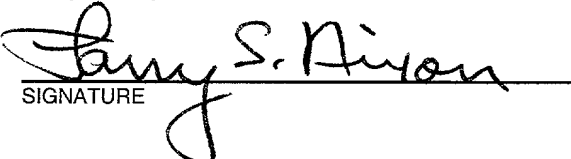


FORM PTO-1390 (REV 11-98)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 36-1399
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5) 09/743702 Unknown
INTERNATIONAL APPLICATION NO. PCT/GB99/02492	INTERNATIONAL FILING DATE 30 July 1999	PRIORITY DATE CLAIMED 14 August 1998
TITLE OF INVENTION INTELLIGENT NETWORK SERVICES		
APPLICANT(S) FOR DO/EO/US PETTIFOR et al.		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19 th month from the earliest claimed priority date. 5. A copy of the International Application as filed (35 U.S.C. 371(c)(2)). a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).		
Items 11. To 16. Below concern document(s) or information included:		
11. <input type="checkbox"/> An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98. 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information. Copies of Amended Sheets (pages 2, 7 and 8) <input type="checkbox"/> This application is entitled to "Small entity" status. <input type="checkbox"/> "Small entity" statement attached.		

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.53) Unknown 09/743702		INTERNATIONAL APPLICATION NO PCT/GB99/02492		ATTORNEY'S DOCKET NUMBER 36-1399	
17. <input checked="" type="checkbox"/> The following fees are submitted:				CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): -- Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO\$1000.00 -- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....\$860.00 -- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO\$710.00 -- International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)\$690.00 -- International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4).....\$100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$	860.00
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).				\$	0.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	11	-20 = 0	X \$18.00	\$	0.00
Independent Claims	2	-3 = 0	X \$80.00	\$	0.00
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			\$270.00	\$	0.00
TOTAL OF ABOVE CALCULATIONS =				\$	860.00
Reduction by 1/2 for filing by small entity, if applicable. Small entity status must also be asserted. (Note 37 C.F.R. 1.9, 1.27, 1.28).					0.00
SUBTOTAL =				\$	860.00
Processing fee of \$130.00, for furnishing the English Translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)).					0.00
TOTAL NATIONAL FEE =				\$	860.00
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property				\$	40.00
Fee for Petition to Revive Unintentionally Abandoned Application (\$1240.00 - Small Entity = \$620.00)				\$	0.00
TOTAL FEES ENCLOSED =				\$	900.00
				Amount to be:	
				refunded	\$
				Charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$900.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. 14-1140 in the amount of \$_____ to cover the above fees. A duplicate copy of this form is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-1140. A duplicate copy of this form is enclosed. d. <input type="checkbox"/> The entire content of the foreign application(s), referred to in this application is/are hereby incorporated by reference in this application.					
NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: NIXON & VANDERHYE P.C. 1100 North Glebe Road, 8 th Floor Arlington, Virginia 22201 Telephone: (703) 816-4000					
				 SIGNATURE	
				Larry S. Nixon NAME	
				25,640 REGISTRATION NUMBER	
				January 16, 2001 Date	

09/743702

JCOZ Rec'd PCT/PTO

16 JAN 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

PETTIFOR et al.

Atty. Ref.: 36-1399

Serial No. **Unknown**

Group:

National Phase of **PCT/GB99/02492**

Filed: **January 16, 2001**

Examiner:

For: **INTELLIGENT NETWORK SERVICES**

* * * * *

January 16, 2001

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to calculation of the filing fee and in order to place the above identified application in better condition for examination, please amend the claims as follows:

IN THE CLAIMS

Claim 3, line 1, delete "or 2".

Claim 6, line 1, delete "4 or 5,".

Claim 7, line 1, change "any one of claims 3 to 6" to -- claim 3 --.

Claim 11, line 1, change "any of claims 8, 9 or 10" to -- claim 8 --.

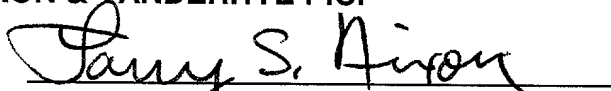
REMARKS

The above amendments are made to place the claims in a more traditional format.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By:



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LSN:Imy

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Arlington, VA 22201-4714
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Intelligent Network Services

The present invention relates to a telephone network and a method of call processing in a telephone network.

- 5 In the present application, "enhanced service" means any service provided to a subscriber other than simple connection made, in response to dialling by a caller, between the terminal equipment from which the caller attempts to establish the call and another, "target", terminal equipment to which the attempt is made, and the associated signalling of ringing, engaged status and number unobtainable.
- 10 The enhanced service may be provided to either the subscriber making the call attempt (for example call barring) or to the subscriber at the target terminal equipment (for example voice mail).

- It is known to provide such enhanced services, sometimes known as "intelligent network" services, in telephone networks. The processing required to
- 15 implement such services can be carried out by a telephone switching centre. However, this has been found to be undesirable because telephone switching equipment manufacturers must customise their switches according to different network operators' requirements. This increases the cost of such equipment.

- An alternative approach is to use a relatively simple switching centre in
- 20 conjunction with an enhanced service processing apparatus, or "service control point". In this arrangement, the switching centre notifies the enhanced service processing apparatus of an attempt to establish a call connection and the enhanced service processing apparatus returns switching control commands such as "proceed as normal" or "bar call".

- 25 A third approach, exemplified in International Patent Specifications WO97/48238 and WO96/13949 also use an enhanced service processing apparatus, but this is invoked only if the switching centre identifies the call as being of a type which may require enhanced processing, either because the digits dialled identify a target party for which enhanced processing capability is required,
- 30 or because such capability has been previously specified for the calling party.

A disadvantage with these approaches is that there is often a lot of traffic between the switching centres and the enhanced service processing apparatus consisting of notifications of call connection establishment attempts and "proceed

as normal" commands, for example, if the conditions for call forwarding are not met (line not busy, wrong time of day, etc). This extra traffic, and the extra processing carried out by the enhanced service processing apparatus, can impede the efficient operation of the enhanced services processes. It is an aim of the present invention to

5 solve or ameliorate the aforementioned problem.

According to the present invention, there is provided a telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus,

the switching centre having event detection means for recording the

10 occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:

notify the enhanced service processing apparatus of that attempt, or:

establish or terminate said call connection without such notification;

15 according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre. As a consequence, traffic between the switching centre and the enhanced services processing apparatus only occurs when there is at least the

20 possibility of a switching control command other than "proceed as normal".

Preferably, the switching centre includes processing means including flag means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to determine, in

25 dependence on the state of the flag means, whether to notify the enhanced service processing apparatus of the attempt. The switching centre therefore merely requires a flag to be set for each subscriber line to indicate whether the switch should currently invoke the enhanced services processing apparatus. The flags are controlled by the service processing apparatus, in response to requests from the user, or other events.

30 The switch itself carries out no processing of the enhanced service, other than to determine from the flag setting whether the enhanced services processing apparatus is required.

Preferably, event-detecting means is included for detecting a predetermined event and notifying the switching centre of an occurrence of said event.

Preferably, the processing means includes a plurality of flag means associated with respective predetermined events, the processing means being responsive to notification of one of said predetermined events to change the state of the associated flag means and, in the event of an attempt to establish or
5 terminate a call connection via said subscriber line to select, in dependence on the states of the flag means together with the flag means state information, whether to notify the enhanced service processing apparatus of the attempt, and to perform such notification if so selected. More preferably, the enhanced service processing apparatus generates said switching control commands in dependence
10 on said flag state information.

The event detecting means may comprise a voice mail system, in which case the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line. The event detecting means may comprise a call charging system, in which case the event or one of the events comprises the
15 accumulated call charges for the subscriber of said subscriber line exceeding a threshold value.

According to the present invention, there is also provided a method of processing calls in a telephone network comprising:-

recording the occurrences of one or more predetermined events at a
20 telephone switching centre, said events being associated with a subscriber line connected to the switching centre;

detecting attempts to establish or terminate calls via the subscriber line;

determining whether a record of the occurrence of one or more of said predetermined events exists at the switching centre; and
25

if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-

notifying an enhanced service processing apparatus of the attempt;

generating switching control commands at the enhanced service processing apparatus; and
30

communicating said commands to the switching centre to control the establishment or termination of said call; but

if it is determined that no record of the occurrence of one or more of said predetermined events currently exists at the switching centre:-

establishing or terminating the call using only the switching functions of the switching centre.

- 5 The event may comprise, for example, storing of voice mail, or exceeding of a threshold value by a cumulative parameter relating to usage of the telephone system, such as call charges accumulated on the user's account. Other events, such as accessing the voice mail or replenishing the funds in a user account, may cause such records to be erased, such that the enhanced service processing
10 apparatus is not then notified of further call attempts until a further occurrence of the predetermined event.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates part of a telephone system;

- 15 Figure 2 illustrates switching centre of the telephone system of Figure 1; and Figures 3, 4 and 5 are flow diagrams illustrating the operation of the system of Figure 1.

Referring to Figure 1, a telephone system comprises a terminal equipment 1, for instance a telephone set, connected by a telephone line to a switching
20 centre 2. The switching centre is connected to the rest of the Public Switched Telephone Network 3 and also to a service control point 4. The service control point 4 provides instructions to the switching centre 2 for the provision of enhanced services.

Referring to Figure 2, the switching centre comprises a digital switching
25 matrix 5, a plurality of subscriber line cards 6 connected to the switching matrix 5, a plurality of trunk interfaces 7 also connected to the switching matrix 5, a control processor 8 and a plurality of signalling interfaces 9, some of which are coupled to subscriber lines and some of which are connected to trunks. The control processor 8 controls the operation of the digital switching matrix 5 in response to
30 signalling data from the signalling interfaces 9 and switching control commands from the service control point 4. The control processor 8 also receives data from and sends data to a call charging subsystem 10.

The operation of the exemplary embodiment of Figures 1 and 2 will now be described with reference to Figures 3, 4 and 5.

It is known for a calling party to be offered the opportunity of leaving a voice mail message in the event that the called party does not answer the call.

- 5 This known process differs in a system according to the present invention in that an "end of call-voice mail" flag, or trigger, is set in the control processor 8 when voice mail is left.

- When the called party subsequently makes a call and that call terminates, the control processor 8 notes that the "end of call-voice mail" flag is set and calls
10 the service control point 4, sending the identity of the flag and the identity of the subscriber. The service control point 4 responds by returning switching control commands to the control processor 8 of switching centre 2 to cause it to connect the subscriber to a voice mail centre so that he can listen to his voice mail.

- Another function provided by the present embodiment is call barring in the
15 event of call charges reaching a limit value. In order to provide this function, the control processor 8 implements an "start of call - excess charge" flag. Normally, this flag is set to false. Accordingly, when the subscriber makes a call, the call is routed by the switch centre 2 without reference to the service control point 4. However, if the cost of the subscriber's calls exceed a threshold value, the call
20 charging sub-system 10 notifies the switching centre 2 which then sets the "start of call - excess charge" flag. Consequently, when the subscriber now attempts to make a call, the control processor 8 detects that the call is being made and that the "start of call - excess charge" flag is set, and notifies the service control point 4. The service control point 4 then returns call barring commands to the control
25 processor 8 of the switching centre 2. The control processor 8 responds by controlling to switching matrix 5 so as to bar the subscriber's call.

Referring to Figures 3, 4 and 5, it will be appreciated that the operation of a system according to the present invention may be generalised as follows.

- A first process of the control processor 8, shown in Figure 3, monitors the
30 signalling interfaces 9 for predetermined events (step s1-1) and, if one of the predetermined events is detected, it causes a flag setting to be changed (step s1-2). In the same process, the control processor 8 checks for incoming notification signals from other system control and administration components, e.g. a call

charging sub-system, (step s1-3) and, if such signals are received, sets corresponding flags (step s1-4).

A second process of the control processor 8, shown in Figure 4, comprises determining that a party is attempting to set up call (step s2-1) and
5 determining whether any relevant flags, i.e. flags associated with one or other of the would-be parties to the call, are set (step s2-2). If a flag is set, the control processor 8 communicates this information to the service control point 4 (step s2-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service
10 control point 4 (step s2-4) and implements them (step s2-5). If no flags are set, the call is routed without reference to the service control point 4.

A third process of the control processor 8, shown in Figure 5, comprises determining that a call is being terminated (step s3-1) and determining whether any relevant flags, i.e. flags associated with one or other of the parties to the call,
15 are set (step s3-2). If a flag is set, the control processor 8 communicates this information to the service control point 4 (step s3-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service control point 4 (step s3-4) and implements them (step s3-5). If no flags are set, the call terminates in the normal
20 manner with no reference being made to the service control point 4.

It will be appreciated that flags associated with many different events may be implemented and that the present invention is not limited to the illustrative examples described above.

Claims

1. A telephone network comprising a telephone switching centre coupled to a subscriber line, and an enhanced service processing apparatus,
- 5 the switching centre having event detection means for recording the occurrence of a predetermined event associated with the subscriber line, and call processing means responsive to an attempt to establish or terminate a call connection via the subscriber line to selectively either:
- 10 notify the enhanced service processing apparatus of that attempt, or:
establish or terminate said call connection without such notification;
according to whether occurrence of the predetermined event has been recorded by the detection means, the enhanced service processing apparatus having means responsive to such notification to send switching control commands to the telephone switching centre.
- 15
2. A network according to claim 1, wherein the switching centre includes processing means including flag means, the processing means having means responsive to notification of said predetermined event to change the state of said flag means and, having means to determine, in dependence on the state of the flag means,
- 20 whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line.
3. A network according to claim 1 or 2, including event detecting means for detecting a predetermined event and notifying the switching centre of an occurrence
- 25 of said event.
4. A network according to claim 2, wherein the processing means includes a plurality of flag means associated with respective predetermined events, the processing means having means to change the state of the associated flag means in
- 30 response to notification of one of said predetermined events and selection means controlled in dependence on the states of the flag means, together with the flag means state information, the selection means being arranged to select whether to notify the enhanced service processing apparatus of an attempt to establish or terminate a call connection via said subscriber line, and to perform such notification if
- 35 so selected.

5. A network according to claim 4, wherein the enhanced service processing apparatus has means to control the switching centre in dependence on said flag state information.

5

6. A network according to claim 3, 4 or 5, wherein the event detecting means comprises a voice mail system, the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line.

10 7. A network according to any one of claims 3 to 6, wherein the event detecting means comprises a call charging system and the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.

15 8 A method of processing calls in a telephone network comprising:-
recording the occurrences of one or more predetermined events at a telephone switching centre, said events being associated with a subscriber line connected to the switching centre;

detecting attempts to establish or terminate calls via the subscriber line;
20 determining whether a record of the occurrence of one or more of said predetermined events exists at the switching centre; and

if it is determined that a record of the occurrence of one or more of said predetermined events exists at the switching centre:-

notifying an enhanced service processing apparatus of the attempt;
25 generating switching control commands at the enhanced service processing apparatus; and

communicating said commands to the switching centre to control the establishment or termination of said call; but

if it is determined that no record of the occurrence of one or more of
30 said predetermined events currently exists at the switching centre:-

establishing or terminating the call using only the switching functions of the switching centre.

9. A method according to claim 8, wherein said event comprises storing of voice mail.

5 10. A method according to claim 8, wherein said event comprises the exceeding of a threshold value by a cumulative parameter relating to usage of the telephone system.

11. A method according to any of claims 8, 9 or 10, wherein the recording of
10 the occurrence of one or more of the said events takes the form of erasure or cancellation of the recording of another of the said events having occurred previously, such that the enhanced service processing apparatus is not then notified of further call attempts until a further occurrence of the said previously-occurring event.

Abstract

Intelligent Network Services

- 5 In a telephone network, a service control point (4) is called by a switching centre (2), if a flag has previously been set by some event, e.g. call charges crossing a threshold or the leaving of a voice mail message, when a call is being established or terminated. The switching centre (2) then operates in accordance with commands returned by the service control point (4). If no flags have been set the
- 10 service control point (4) is not called, the call is treated by the switching centre (2) in a default manner.

(Figure 2)

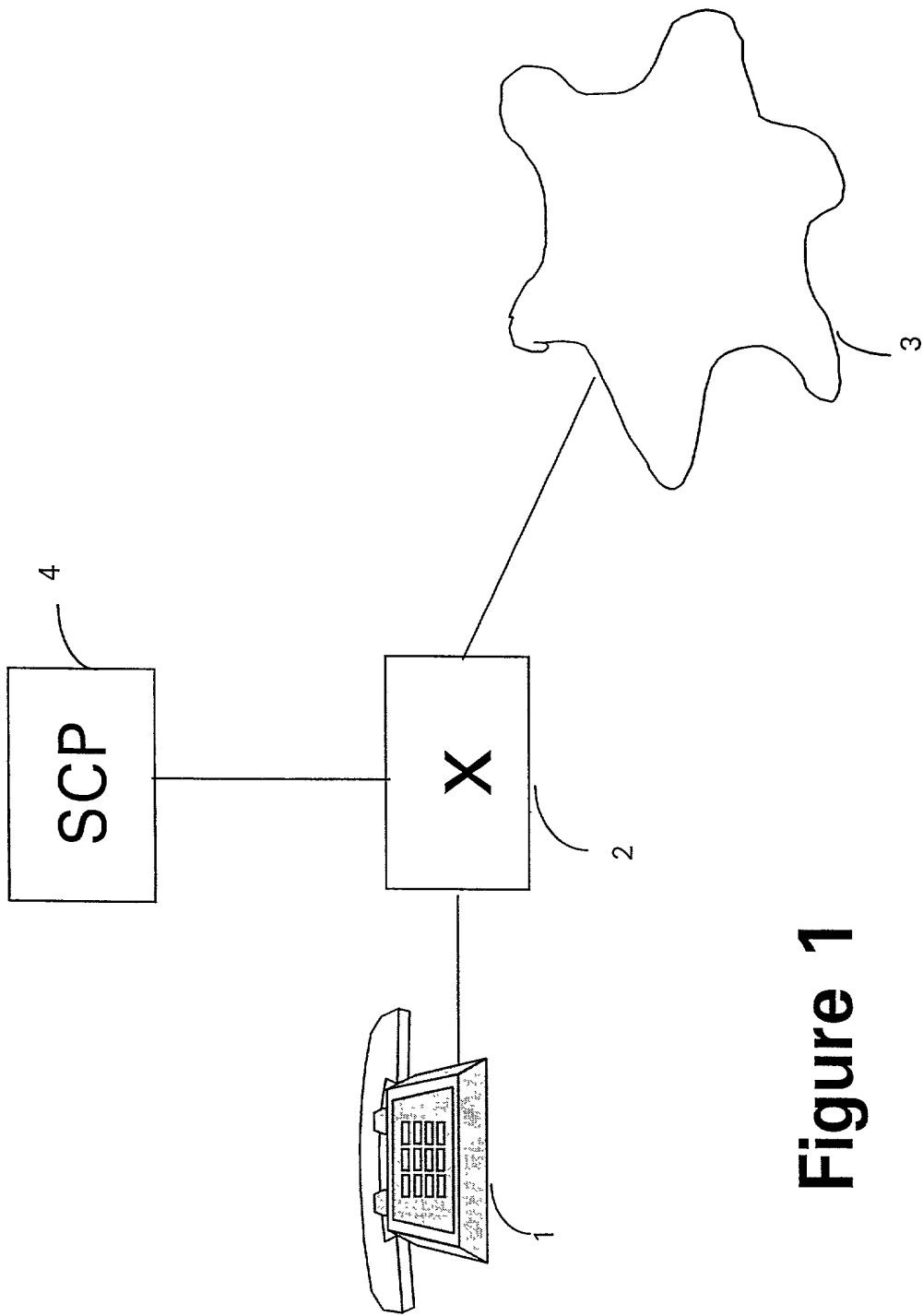
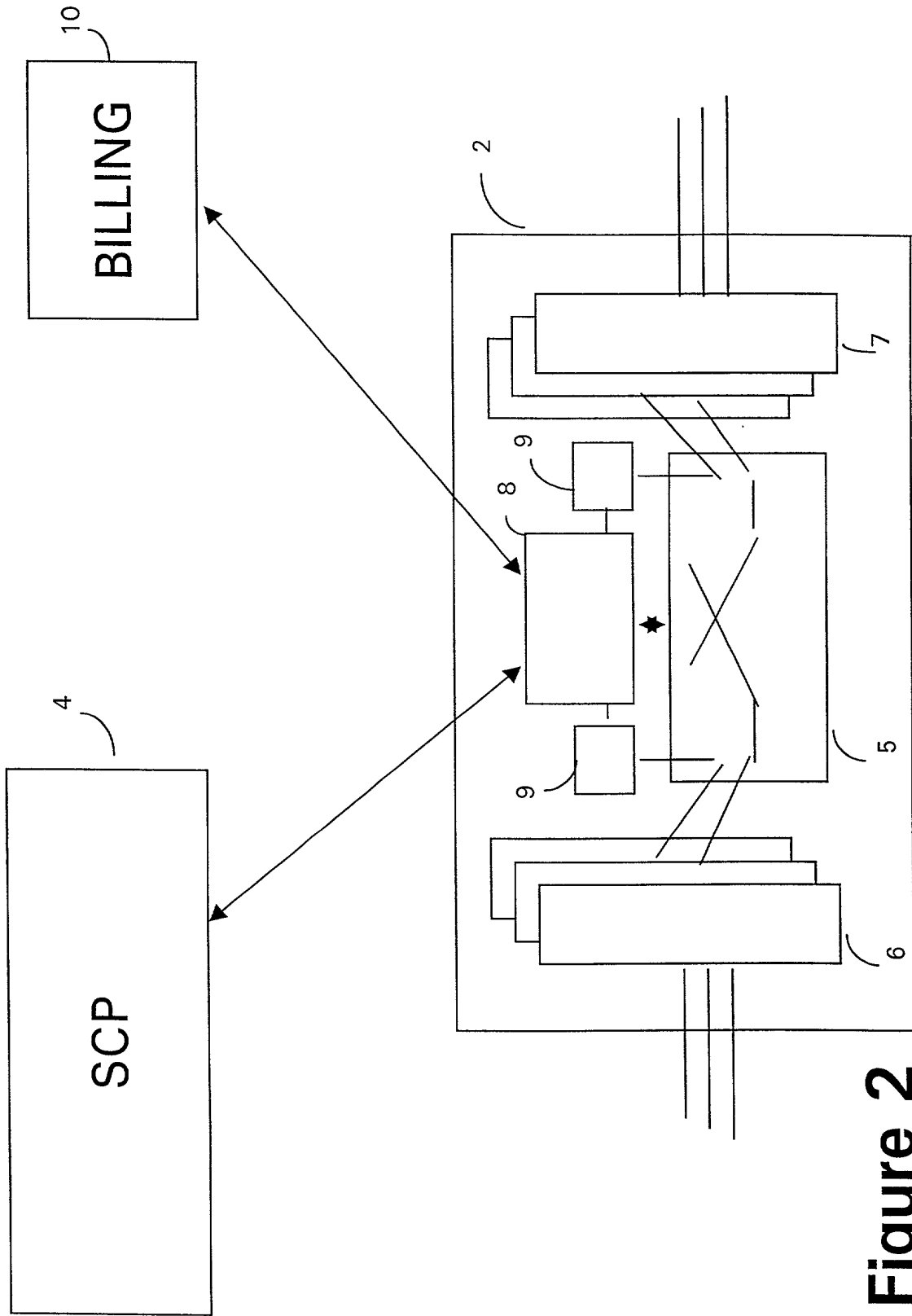


Figure 1



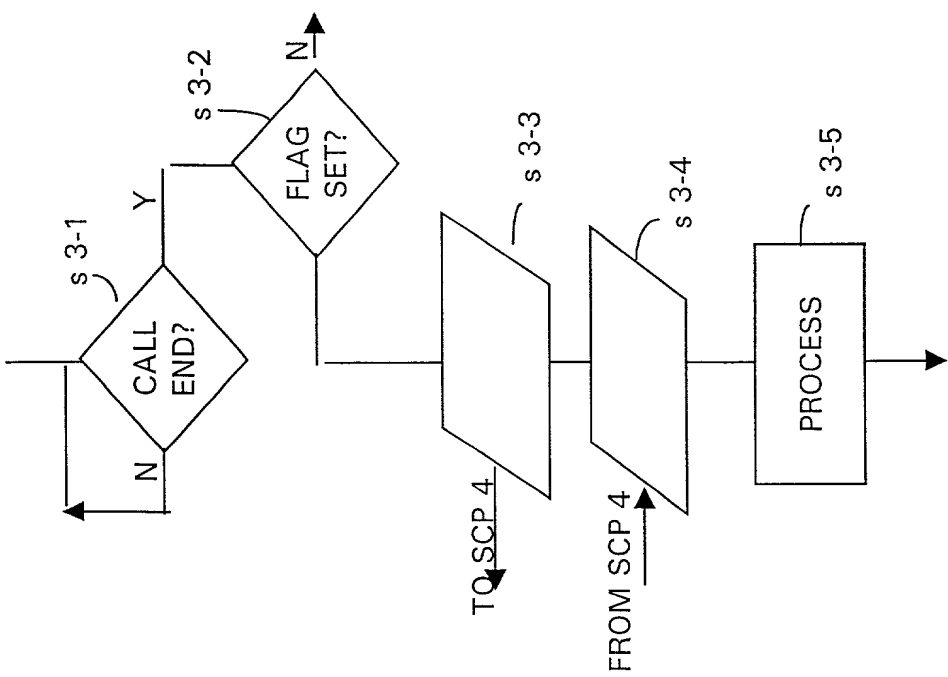


Figure 5

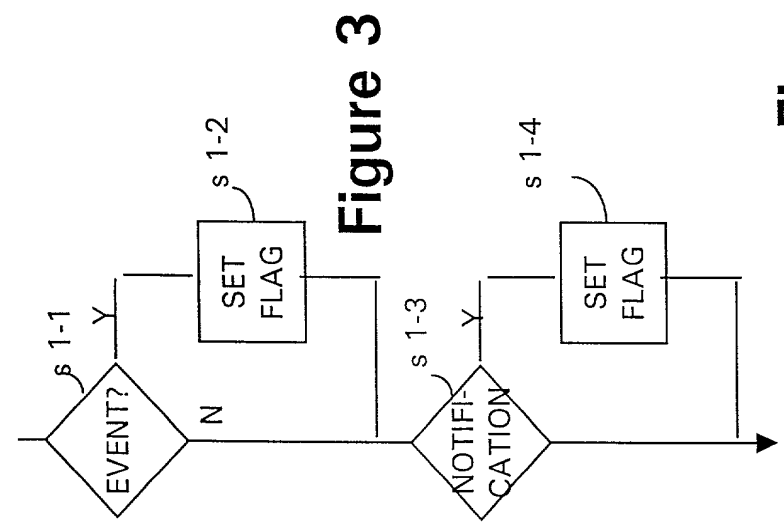


Figure 3

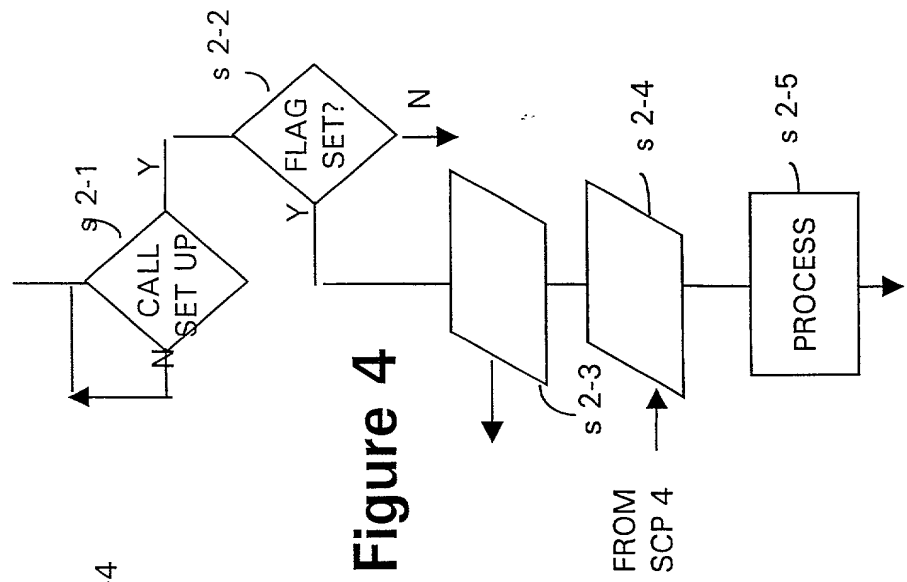


Figure 4

and (if applicable to U.S. or PCT application) was amended on

14 August 1998

Day/Month/Year Filed

PENDING

IP9 2UZ

FOR ADDITIONAL INVENTORS, check box [X] and attach sheet with the same information and signature and date for each.